From: "Milton, Tom M." <TMMILTON@southernco.com>
To: <cvh@nrc.gov>
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Subject: Vogtle Part 21 Interim Report-Cutler Hammer Components

This email documents the final resolution of the subject report which Southern Nuclear Operating Company (SNC) submitted to the NRC on March 2, 2005, regarding Cutler Hammer overload relays and heater packs. During pre-installation testing of several thermal overload relays with different model heater packs, instances were found where single and multiple overload relay phases would trip either early, late, or not at all. The interim report was submitted because an evaluation to determine reportability could not be completed within 60 days of discovery. The NRC proceeded to post this interim report on their Part 21 website as item 2005-12-00. SNC has since completed its evaluation regarding this issue as discussed below, which concluded a reportable condition did not exist.

As stated in the interim report, the thermal overload relays are Cutler-Hammer type C306 bimetallic relays that detect motor overcurrents by converting the current to heat via a resistive element (heater pack). Bimetallic type overload relays open the circuit when heat is sufficient to cause a bimetallic element to bend which in turn acts on a tripper bar that opens a set of trip contacts. The time required for the bimetallic element to open the contacts is dependant on the amount of current passing through the circuit. The heater packs used in these relays are the resistive elements which supply the heat to the bimetallic element. The heater pack size is based on the full load amps (FLA) of the motor. The resistance varies between the various heater pack sizes and thus the same relay can be used for a wide range of motor FLA.

The overload relay is also equipped with a setting dial that is used to adjust the gap between the tripper bar and the trip contact switch thus requiring the bimetallic element to move farther to open the set of trip contacts. This feature allows each heater pack to cover a wider range of FLA. The dial setting is labeled A, B, C, and D with an additional tic mark between each. The dial setting is continuous, not notched or discrete. Framatome supplied relay settings tables showing appropriate FLA for specific heater pack sizes and dial settings. These tables instruct the user to interpolate between the dial settings for other FLA. Framatome also supplied time current characteristic (TCC) curves with these relays showing the relationship between time and percentage of FLA for both single phase and three phase operation.

In conversations with Framatome regarding this issue, they stated that although a dial setting is specified for the application of an overload relay, the expectation is that these are not precision devices and it will be necessary to fine-tune the continuous setting dial to achieve the desired response. For example, if a "B" setting is specified, the actual setting might typically fall within the range from the tic mark between the "A" and "B" setting to the tic mark between the "B" and "C" setting. Accordingly, each relay must be individually adjusted during testing to achieve proper trip time for the current applied. However, having to "tweak" the setting does not mean that the relay or heater packs are defective.

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